

provided in the kit without functional groups, in which case they must be functionalized prior to performing the assay.

In another embodiment, the kit comprises at least one container. The container holds metallic or semiconductor nanoparticles having oligonucleotides attached thereto. The oligonucleotides have a sequence complementary to a portion of a nucleic acid and have fluorescent molecules attached to the ends of the oligonucleotides not attached to the nanoparticles.

In yet another embodiment, the kit comprises a substrate, the substrate having attached thereto nanoparticles. The nanoparticles have oligonucleotides attached thereto which have a sequence complementary to the sequence of a first portion of a nucleic acid. The kit also includes a first container holding nanoparticles having oligonucleotides attached thereto which have a sequence complementary to the sequence of a second portion of the nucleic acid. The oligonucleotides may have the same or different sequences, but each of the oligonucleotides has a sequence complementary to a portion of the nucleic acid. The kit further includes a second container holding a binding oligonucleotide having a selected sequence having at least two portions, the first portion being complementary to at least a portion of the sequence of the oligonucleotides on the nanoparticles in the first container. The kit also includes a third container holding nanoparticles having oligonucleotides attached thereto, the oligonucleotides having a sequence complementary to the sequence of a second portion of the binding oligonucleotide.

In another embodiment, the kit comprises a substrate having oligonucleotides attached thereto which have a sequence complementary to the sequence of a first portion of a nucleic acid. The kit also includes a first container holding nanoparticles having oligonucleotides attached thereto which have a sequence complementary to the sequence of a second portion of the nucleic acid. The oligonucleotides may have the same or different sequences, but each of the oligonucleotides has a sequence complementary to a portion of the nucleic acid. The kit further includes a second container holding nanoparticles having

oligonucleotides attached thereto which have a sequence complementary to at least a portion of the oligonucleotides attached to the nanoparticles in the first container.

In yet another embodiment, the kits can have the substrate, oligonucleotides and nanoparticles in separate containers. The substrate, oligonucleotides, and nanoparticles would have to be appropriately attached to each other prior to performing an assay to detect a nucleic acid. The substrate, oligonucleotides and/or the nanoparticles may be functionalized to expedite this attachment. Alternatively, the substrate, oligonucleotides and/or nanoparticles may be provided in the kit without functional groups, in which case they must be functionalized prior to performing the assay.

In a further embodiment, the kit comprises a substrate having oligonucleotides attached thereto which have a sequence complementary to the sequence of a first portion of a nucleic acid. The kit also includes a first container holding liposomes having oligonucleotides attached thereto which have a sequence complementary to the sequence of a second portion of the nucleic acid and a second container holding nanoparticles having at least a first type of oligonucleotides attached thereto, the first type of oligonucleotides having a cholesteryl group attached to the end not attached to the nanoparticles so that the nanoparticles can attach to the liposomes by hydrophobic interactions. The kit may further comprise a third container holding a second type of nanoparticles having oligonucleotides attached thereto, the oligonucleotides having a sequence complementary to at least a portion of the sequence of a second type of oligonucleotides attached to the first type of nanoparticles. The second type of oligonucleotides attached to the first type of nanoparticles having a sequence complementary to the sequence of the oligonucleotides on the second type of nanoparticles.

In another embodiment, the kit may comprise a substrate having nanoparticles attached to it. The nanoparticles have oligonucleotides attached to them which have a sequence complementary to the sequence of a first portion of a nucleic acid. The kit also includes a first container holding an aggregate probe. The aggregated probe comprises at least two types of nanoparticles having oligonucleotides attached to them. The nanoparticles

of the aggregate probe are bound to each other as a result of the hybridization of some of the oligonucleotides attached to each of them. At least one of the types of nanoparticles of the aggregate probe has oligonucleotides attached to it which have a sequence complementary to a second portion of the sequence of the nucleic acid.

5 In yet another embodiment, the kit may comprise a substrate having oligonucleotides attached to it. The oligonucleotides have a sequence complementary to the sequence of a first portion of a nucleic acid. The kit further includes a first container holding an aggregate probe. The aggregate probe comprises at least two types of nanoparticles having oligonucleotides attached to them. The nanoparticles of the aggregate probe are bound to
10 each other as a result of the hybridization of some of the oligonucleotides attached to each of them. At least one of the types of nanoparticles of the aggregate probe has oligonucleotides attached thereto which have a sequence complementary to a second portion of the sequence of the nucleic acid.

In an additional embodiment, the kit may comprise a substrate having
15 oligonucleotides attached to it and a first container holding an aggregate probe. The aggregate probe comprises at least two types of nanoparticles having oligonucleotides attached to them. The nanoparticles of the aggregate probe are bound to each other as a result of the hybridization of some of the oligonucleotides attached to each of them. At least one of the types of nanoparticles of the aggregate probe has oligonucleotides attached to it
20 which have a sequence complementary to a first portion of the sequence of the nucleic acid. The kit also includes a second container holding nanoparticles. The nanoparticles have at least two types of oligonucleotides attached to them. The first type of oligonucleotides has a sequence complementary to a second portion of the sequence of the nucleic acid. The second type of oligonucleotides has a sequence complementary to at least a portion of the
25 sequence of the oligonucleotides attached to the substrate.

In another embodiment, the kit may comprise a substrate which has oligonucleotides attached to it. The oligonucleotides have a sequence complementary to the sequence of a first portion of a nucleic acid. The kit also comprises a first container holding liposomes